Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Previously Amended) A method for operating an optical crossbar switch having a plurality of selectable reflective optical switching elements, said method comprising:

focusing a selected input light beam on a first selected reflective optical switching element, the first selected reflective optical switching element directing the selected input light beam to a first output;

selecting a second reflective optical switching element; and,

varying a focus of said selected input light beam to focus said selected input light beam on said second selected reflective optical switching element, the second selected reflective optical element directing the selected input light beam to a second output.

2. (Previously Amended) A method as in claim 1, wherein said focusing comprises varying a focal length of an adaptive optical element.

3. (Original) A method as in claim 2 wherein said adaptive optical element comprises a variable mirror device.

4. (Original) A method as in claim 2 wherein said adaptive optical element comprises a variable lens.

5 to 19 (Cancelled).

20. (Currently Amended) A method as in ~~any one of claims~~ claim 4 ~~and 19~~ wherein said variable lens comprises a variable micro-machined membrane lens.

21. (Previously Amended) An optical crossbar switch for switching input light beams, the switch comprising :

at least one adaptive optical element having a focal length variable over a range, the adaptive optical element located in a path of a selected input light beam; and,

a plurality of selectable reflective optical elements, said selectable reflective optical elements alternatively selectable and interposable in the path of the selected input light beam to direct the selected input light beam to a corresponding one of a plurality of outputs;

wherein more than one of said selectable reflective optical elements are located within the range over which said adaptive optical element is capable of focusing said selected input light beam.

22. (Original) An optical crossbar switch as in claim 21, wherein said adaptive optical element comprises a variable mirror device.

23. (Original) An optical crossbar switch as in claim 21, wherein said adaptive optical element comprises a variable lens.

24. (Previously Amended) An optical crossbar switch as in claim 23 wherein said variable lens comprises a variable micro-machined membrane lens.

25. (Previously Added) An apparatus for directing an optical signal from an input channel to a selected one of a plurality of output channels, the apparatus comprising:

a plurality of individually switchable reflective elements located to intercept an optical signal from the input channel, the plurality of reflective elements having a plurality of selectable configurations, each of the configurations directing the optical signal to a corresponding one of the output channels, in each of the configurations the optical signal incident on a selected one of the reflective elements; and,

at least one adjustable focus optical element in an optical path between the input channel and the plurality of reflective elements, the at least one adjustable focus optical element configured to focus the optical signal onto a currently selected one of the reflective elements and, upon a different one of the reflective elements becoming the currently selected one of the reflective elements, to vary a focus of the adjustable focus optical element to focus the optical signal onto the different one of the reflective elements.

26. (Previously Amended) An apparatus according to claim 25, wherein each of the plurality of reflective elements corresponds to one of the plurality of output channels and in each of the configurations the selected one of the reflective elements is the reflective element corresponding to the corresponding output channel.

27. (Previously Added) An apparatus according to claim 26 wherein each of the plurality of individually switchable reflective elements is moveable between a reflective state and a non-reflective state.

28. (Previously Added) An apparatus according to claim 27, wherein each of the plurality of individually switchable reflective elements comprises a member movable between a substantially flat orientation and a substantially upright orientation and when the reflective element is in

its reflecting state, the element is in its substantially upright orientation.

29. (Previously Added) An apparatus according to claim 25, wherein each of the plurality of individually switchable reflective elements comprises a micro-machined mirror.

30. (Previously Added) An apparatus according to claim 25, wherein the adjustable focus optical element comprises one of: an adjustable focus reflective element and an adjustable focus transmissive element.

31. (Previously Added) An apparatus according to any one of claims 25, 26 and 28 comprising a plurality of second adjustable focus optical elements each located in an optical path between the plurality of reflective elements and a corresponding one of the output channels.

32. (Previously Added) An apparatus according to claim 31 comprising a plurality of collimating lenses, each of the collimating lenses disposed in an optical path between one of the plurality of second adjustable focus optical elements and a corresponding output channel.

33. (Previously Added) An apparatus according to any one of claims 25, 26 and 28 comprising a collimating lens disposed between the input channel and the at least one adjustable focus optical element.

34. (Previously Added) An apparatus according to claim 25 wherein the input channel comprises an optical fiber.

35. (Previously Added) An apparatus according to claim 25 wherein the plurality of individually switchable reflective elements comprises a linear array of micro-machined mirrors.

36. (Previously Added) An apparatus according to claim 35 comprising a plurality of input channels wherein the plurality of individually switchable reflective elements comprises a plurality of linear arrays of micro-machined mirrors, the plurality of linear arrays including a mirror corresponding to each possible combination of one of the input channels and one of the output channels.

37. (Previously Added) An apparatus according to claim 25, wherein the adjustable focus optical element comprises a liquid crystal lens.

38. (Currently Amended) A switch for switching optical signals comprising:

a plurality of optical input channels and a plurality of optical output channels;

a plurality of individually switchable reflective elements, each of which is switchable between a reflecting state and a non-reflecting state; and

a plurality of adjustable focus optical elements, each of the adjustable focus optical elements in an optical path between a corresponding one of the input optical channels and the plurality of individually switchable reflective elements, each of the adjustable focus optical elements capable of focusing an optical signal from the corresponding one of the input channels onto any one of a plurality of the plurality of individually switchable reflective elements , each of the plurality of the plurality of individually switchable reflective elements located to require a different focus setting of the adjustable focus optical element;

wherein an optical signal may be directed from a selected one of the input optical channels to a selected one of the output optical channels by switching a selected one of the plurality of reflective elements to its reflecting state and adjusting a focus of the at least one

adjustable focus optical element corresponding to the selected input optical channel to focus the optical signal onto the selected reflective element.

39. (Previously Added) A method for directing an optical signal from an input channel to a selected one of a plurality of output channels, the method comprising:

actuating a reflective element to direct an optical signal from the input channel to a selected one of the output channels; and,

operating an adjustable focus optical element to focus the optical signal from the input channel onto the reflective element.

40. (Currently Amended) A method according to claim 39, wherein actuating the reflective element comprises moving the reflective element between a position wherein the reflective element is in a non-reflecting state and a position wherein the reflective ~~elements~~ element is in a reflecting state.

41. (Previously Added) A method according to claim 40, wherein actuating the reflective element comprises flipping the reflective element from a substantially flat orientation to a substantially upright orientation.

42. (Previously Added) A method according to claim 39, wherein the reflective element comprises a micro-machined mirror.

43. (Previously Added) A method according to any one of claims 39 and 40 comprising providing a second adjustable focus optical element in an optical path between the reflective element and the selected one of the output channels and adjusting a focal length of the second

adjustable focus optical element to couple the optical signal to the selected one of the output channels.

44. (Previously Added) The method of claim 39 comprising switching the optical signal from the selected one of the output channels to a different one of the output channels by:

deactivating the reflective element and activating a different reflective element; and,

adjusting the adjustable focus optical element to focus the optical signal onto the different reflective element.

45. (Previously Added) A method according to claim 44, wherein activating the different reflective element comprises switching the different reflective element from a non-reflecting state to a reflecting state.

46. (Currently Amended) A method for directing an optical signal from a selected one of a plurality of input channels to a selected one of a plurality of output channels comprising:

actuating a reflective element corresponding to the selected input and output channels; and,

~~focusing~~ altering a focus of an optical signal from the selected input channel to focus the optical signal onto the actuated reflective element.

47. (Currently Amended) The method of claim 46 wherein ~~focusing an~~ altering the focus of the optical signal ~~from the selected input channel onto the reflective element~~ comprises adjusting a variable focus optical element disposed in an optical path between the selected input channel and the reflective element.

48. (Previously Added) The method of claim 46 comprising adjusting a second variable focus optical element disposed in an optical path between the reflective element and the selected output channel to couple the optical signal to the selected output channel.

49. (Previously Amended) A method for redirecting a radiation beam in an optical crossbar switch comprising a plurality of individually selectable reflective optical switching elements, the method comprising:

focusing a selected radiation beam on a first selected reflective optical switching element;

selecting a second reflective optical switching element; and,

focusing the selected radiation beam on the second reflective optical switching element.